UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,908	02/08/2002	David William Kinnard	00-SM5-0142 (ATI-0009)	2272

23413 7590 04/07/2003

CANTOR COLBURN, LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

EXAMINER
ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 04/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/071,908	Applicant(s) KINNARD ET AL.
	Examiner Rudy Zervigon	Art Unit 1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 February 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) *22-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21 and 32-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-21 and 32-36, drawn to a reactor assembly, classified in class 156, subclass 345.33.

   II. Claims 22-28, drawn to a process for flowing a gas, classified in class 427, subclass 248.1.

   III. Claims 29-31, drawn to an inlet manifold assembly, classified in class 118, subclass 715.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I/III and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another materially different apparatus, for example, an apparatus absent a chuck assembly and exhaust manifold.

3. Inventions I and III are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the detail of the flow-shaping portion of the subcombination is not detailed in

the combination. The subcombination has separate utility such as fluid delivery in ventilation units.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Mr. Peter Hagerty on March 5, 2003 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-21 and 32-36. Affirmation of this election must be made by applicant in replying to this Office action. Claims 22-31 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Refer to interview summary.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 33 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 33 requires "to emit radiation comprises a housing and a light source". Claim 33 is unclear. Correction is required.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-3, 6, 7, 10-14, 16, 18, 19, 21, and 32-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoke et al (USPat. 5,077,875). Hoke teaches a reactor assembly (Figure 3; column 7, lines 30-65) comprising:

i. A base unit (20);

ii. A optionally stationary chuck assembly (30,23) disposed in a cavity (30a,20a) of the base unit, wherein the chuck assembly comprises a support (23) having a surface capable of receiving a substrate (63);

iii. A quartz (applicant's specification [0042]; column 7, lines 30-35) process chamber (11), transparent to UV and IR light sources, comprising a top wall (25), a bottom wall (opposite

25), and sidewalls (not labeled; perpendicular to 25) extending therefrom, wherein the process chamber is coupled to the base unit;

iv. An inlet manifold assembly (15) in fluid communication with a first opening baffle plate / flow restrictor (12) of the process chamber in a selected one of the sidewalls (12), wherein the inlet manifold assembly comprises a flow-shaping portion (15a) adapted to laterally elongate a gas and/or reactant flow in the process chamber; and

v. An exhaust manifold assembly (16, 16b, 17) in fluid communication with a second opening (16b) of the process chamber in the sidewall diametrically opposed from the selected one (12) of the sidewalls, the exhaust manifold assembly is adapted to receive the gas and/or reactant flow from the process chamber at about a plane parallel to the surface of the substrate

   a. The exhaust manifold assembly further comprises an exhaust receiving portion (16, 13) and a rectangular flow restrictor plate ("rectangular aperture"; not labeled; column 10, lines 4-9) having one passageway (16b), wherein the flow restrictor is affixed to an opening of the exhaust receiving portion and is adapted to restrict the gas and/or reactant flow through the opening from the process chamber into the exhaust receiving portion

vi. The triangular flow-shaping portion (15a; Figure 3) of the inlet manifold assembly is adapted to introduce the gas and/or reactant flow into the process chamber at about a plane parallel to a surface of the substrate (column 10, lines 4-21); the flow-shaping portion adapted to laterally elongate a gas and/or a reactant flow into the process chamber – diffuser portion 15a

vii. A light source assembly (IR light source radiation, 31; column 9, lines 36-60) in operable communication with the transparent top wall for projecting radiation into the process chamber

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 4 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoke et al (USPat. 5,077,875) in view of Raaijmakers (USPat. 6,383,330 B1). Hoke is discussed above. Hoke does not teach that his top wall of the process chamber is removable. Raaijmakers teaches a similar horizontal flow deposition chamber (Figure 6; column 11, lines 16-67). Specifically, Raaijmakers teaches that his top wall (112) of the process chamber (110) is removable (Figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make Hoke's top wall of the process chamber removable from the process chamber as taught by Raaijmakers.

Motivation to make Hoke's top wall of the process chamber removable from the process chamber as taught by Raaijmakers is for servicing and/or repairing the chamber components (column 1, lines 5-11).

13. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoke et al (USPat. 5,077,875) in view of Mikio Takagi (JP02-152251[1]). Hoke is discussed above. Hoke does not teach that the bottom wall of the base unit is adapted to be stackedly attached to a second reactor assembly. Mikio Takagi teaches, per the translation, a vertical semiconductor manufacturing system (Page 2) including base units (2) adapted to be stackedly attached to plural reactor assemblies (Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to reproduce and vertically stack Hoke's reactor assembly as taught by Mikio Takagi.

Motivation to reproduce and vertically stack Hoke's reactor assembly as taught by Mikio Takagi is to minimize and effectively utilize expensive clean room space (page 7).

14. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoke et al (USPat. 5,077,875) in view of Tepman et al (USPat. 5,228,501). Hoke is discussed above. Hoke does not teach that his chuck assembly comprises Applicant's means for regulating a substrate's temperature (specification [0039]). Tepman teaches a chuck assembly (Figure 1) including identical means for regulating a substrate's temperature (column 6, lines 34-51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Hoke's chuck assembly with Tepman's chuck assembly including identical means for regulating a substrate's temperature.

Motivation to replace Hoke's chuck assembly with Tepman's chuck assembly is to dissipate heat during processing (column 6, lines 45-51).

---

[1] Refer to STIC Translation

15. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoke et al (USPat. 5,077,875) in view of Gale et al (USPat. 4,839,145). Hoke is discussed above. Hoke does not teach a third opening in the sidewall for transporting the substrate into the interior region of the processing chamber. Gale teaches a similar cross-flow CVD reactor (Figure 20) including a third opening (904, first opening – 908, second opening - 910) in the sidewall for transporting the substrate (920) into the interior region of the processing chamber (not labeled; holding substrates 920).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a third opening in Hoke's sidewall for transporting the substrate into the interior region of the processing chamber as taught by Gale.

Motivation to add a third opening in Hoke's sidewall for transporting the substrate into the interior region of the processing chamber as taught by Gale is to provide added access to the processing chamber.

16. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoke et al (USPat. 5,077,875) in view of Chazee (USPat. 5,190,592). Hoke is discussed above. Hoke does not teach that his exhaust receiving portion is triangularly shaped. Chazee teaches a similar film deposition chamber over substrates (Figure 1; column 1, lines 5-17, 43-66) including an exhaust receiving portion (24; column 2, lines 9-12) that is triangularly shaped.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Hoke's exhaust receiving portion with Chazee's exhaust receiving portion that is triangularly shaped as taught by Chazee.

Motivation to replace Hoke's exhaust receiving portion with Chazee's exhaust receiving portion that is triangularly shaped as taught by Chazee is to "regulate the overflow and suction rate of the residual vapour phase" (column 2, lines 9-12).

17. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoke et al (USPat. 5,077,875) in view of Won et al (USPat. 6,355,108 B1). Hoke is discussed above. Hoke does not teach an exhaust flow restrictor made of anodized aluminum. Won teaches anodized aluminum parts (22) in a film deposition chamber (Figure 3; column 6, lines 8-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to fabricate Hoke's rectangular aperture from anodized aluminum as taught by Won.

Motivation to fabricate Hoke's rectangular aperture from anodized aluminum as taught by Won is to fabricate Hoke's rectangular aperture from an alternate and equivalent material.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPat. 5,405,446; 4,846,102; 6,254,933; 5,304,247; 5,685,906; 4,846,102; 5,044,315; 5,244,694; 5,261,960; 5,288,327; 5,685,906; 6,093,252; 6,254,933; 6,464,792; 4,993,360.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to

the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

JEFFRIE R. LUND
PRIMARY EXAMINER